

## **Fibers reinforced with inorganic whiskers**

**Description of Technology:** This invention concerns a composition comprising a fiber material made of an organic polymer which is anisotropic. The invention is applicable to fiber materials made from polymers which are anisotropic and melt-processable or which are anisotropic and non-melt processable. Such a composition also contains inorganic whiskers in the amount of about 0.1 to 50 percent by volume of the total volume of the organic polymer and inorganic whiskers.

### **Patent Listing:**

1. **US Patent No. 5,512,368**, Issued on April 30, 1996, "Fibers reinforced with inorganic whiskers."

<http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetacgi%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=5,512,368.PN.&OS=PN/5,512,368&RS=PN/5,512,368>

**Market Potential:** According to the present invention, the polymer from which the fiber is made is anisotropic, and non-melt processable or melt processable. The invention is particularly unconventional with respect to fibers made from non-melt processable polymers. By the term "non-melt processable" or the like is meant the polymer cannot be commercially formed into a fiber by melting, shaping of the melt, and cooling. Non-melt processable polymers typically include polymers whose melting and/or softening points are above their decomposition points so that if one attempted to form a melt from such a polymer, the polymer would decompose. For example, many aramids and polyimides are non-melt processable. Such polymers may instead be solution processed, that is, a solution of the polymer is made and subsequently the final shape such as a film or fiber is made using this solution. Such a fiber is made by spinning, for example, by wet or dry spiraling.

By an "anisotropic polymer" is meant one whose polymer chains show order, and in the case of a fiber, are aligned preferentially along the long axis of the fiber. Such polymers include, for instance, non-melt processable aramids, melt processable aramids, non-melt processable polybenzobisthiazoles, and thermotropic liquid crystalline polymers. The polymer chains may be aligned either by spinning or, afterwards, while drawing the fiber. Such polymers tend to have very good tensile strength and modulus, but poor properties in compression. Compression properties are believed to be poor because the aligned polymer chains of the anisotropic polymer tend to buckle under compressive load. It has now been found that when inorganic whiskers are present, compression properties are significantly improved.

### **Benefits:**

- Non-melt processable or melt processable
- Good tensile strength.
- Modulous.
- Improved compression properties when using inorganic whiskers.

### **Applications:**

- Garments that require strong fibers.

### **Contact:**

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